> d abs ibib l4

L4 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2003 ACS
AB The invention is an improved **fuel cell** system suited for application in a vehicle. Specifically, the invention provides an improved system to remove CO emissions that has a rapid dynamic response (about 1 s) and can operate over a wide range of temps. (between 0 and 800.degree.). The **fuel cell** system comprises hydrogen fuel, a CO removal system based upon non-Faradaic electrochem. modification of catalyst activity (**electrochem. promotion**), and a **fuel cell** stack. The CO removal system comprises a catalyst/**working electrode**, an electrolyte, a counter electrode, and a power source. The CO removal system's intrinsic catalytic rate is greater than an intrinsic electrocatalytic rate. The catalyst can be Pt, Rh, Au, Cu/ZnO, Cu/CuO, ABO3 (perovskite), zeolite, and Pd. The power source can be a battery, potentiostat, or galvanostat.

ACCESSION NUMBER: 2002:850186 CAPLUS
DOCUMENT NUMBER: 137:340035
TITLE: **Fuel cell** power plant with electrochemical enhanced carbon monoxide removal
INVENTOR(S): Ding, Yi; Burba, Joseph Carl
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 7 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002164507	A1	20021107	US 2001-848397	20010503

PRIORITY APPLN. INFO.: US 2001-848397 20010503

=> s l3 and electrode
367567 ELECTRODE
275316 ELECTRODES
476173 ELECTRODE
(ELECTRODE OR ELECTRODES)
L5 9 L3 AND ELECTRODE

=> s l5 and catalyst
610821 CATALYST
596715 CATALYSTS
779652 CATALYST
(CATALYST OR CATALYSTS)
L6 7 L5 AND CATALYST

=> s l6 and platinum
159071 PLATINUM
49 PLATINUMS
159081 PLATINUM
(PLATINUM OR PLATINUMS)
L7 4 L6 AND PLATINUM

=> d abs ibib l7

L7 ANSWER 1 OF 4 CAPLUS COPYRIGHT 2003 ACS

AB The invention is an improved **fuel cell** system suited for application in a vehicle. Specifically, the invention provides an improved system to remove CO emissions that has a rapid dynamic response (about 1 s) and can operate over a wide range of temps. (between 0 and 800.degree.). The **fuel cell** system comprises hydrogen fuel, a CO removal system based upon non-Faradaic electrochem. modification of **catalyst** activity (**electrochem. promotion**), and a **fuel cell** stack. The CO removal system comprises a **catalyst**/working **electrode**, an electrolyte, a counter **electrode**, and a power source. The CO removal system's intrinsic catalytic rate is greater than an intrinsic electrocatalytic rate. The **catalyst** can be Pt, Rh, Au, Cu/ZnO, Cu/CuO, ABO3 (perovskite), zeolite, and Pd. The power source can be a battery, potentiostat, or galvanostat.

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=> d abs ibib l7 1-4

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PRIORITY APPLN. INFO.: US 2001-848397 20010503

L7 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2003 ACS
AB The **electrochem. promotion** of catalytic methane oxidn. was studied using a (CH4,O2,Ar),Pt|polybenzimidazole (PBI)-H3PO4|Pt,(H2,Ar) **fuel cell** at 135.degree.C. It has been found that C2H2, CO2, and water are the main oxidn. products. Without polarization the yield of C2H2 was 0.9% and the yield of CO2 was 7.3%. This means that C2 open-circuit selectivity was approx. 11%. Open-circuit voltage was around 0.6 V. It has been shown that the CH4 C2H2 catalytic reaction can be electrochem. promoted at neg. polarization and exhibits a clear "volcano-type" promotion behavior, meaning that there was a max. promotion effect at a polarization of -0.15 V, or 0.45 V **catalyst** potential vs. a hydrogen **electrode** (3.8% C2H2 yield). The catalytic rate enhancement ratio, r(C2)/ro(C2), at this max. was 4.2. There was no C2H2 prodn. at polarization .gtoreq.0.1 and .ltoreq.-0.3 V. The yield of C2H2 decreased with decreasing temp. Dependence of CO2 yield on polarization also showed a "volcano-type" behavior with max. yield of 8.3% at -0.15 V polarization. The catalytic rate enhancement ratio for CO2 prodn., r(CO2)/ro(CO2), at this max. was 1.1, which means that this catalytic reaction is only slightly affected by the electrochem. polarization. This indicates that polarization esp. affects the C2 selectivity of the **catalyst**. The obtained data was explained by the electrochem. prodn. of Pt-H active centers at the electrolyte-**catalyst**-gaseous reactant interface (.lambda..mchgt.1).

ACCESSION NUMBER: 2002:719553 CAPLUS
TITLE: **Electrochemical Promotion** of Oxidative Coupling of Methane on **Platinum** /Polybenzimidazole **Catalyst**
AUTHOR(S): Petrushina, I. M.; Bandur, V. A.; Bjerrum, N. J.; Cappeln, F.; Qingfeng, L.
CORPORATE SOURCE: Department of Chemistry, Materials Science Group, Technical University of Denmark, Lyngby, DK-2800, Den.
SOURCE: Journal of the Electrochemical Society (2002), 149(10), D143-D147
CODEN: JESOAN; ISSN: 0013-4651
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2003 ACS
AB The catalytic activity and selectivity of metals interfaced with solid electrolytes such as yttria-stabilized zirconia (YSZ), an O2- conductor or, .beta."-Al2O3, a Na+ conductor, can be altered dramatically and reversibly via potential application. The increase in catalytic rate can

be several orders of magnitude higher than that anticipated from Faraday's Law. This new phenomenon of **electrochem. promotion** is of considerable theor. and potentially practical importance. The **electrochem. promotion** (or NEMCA) effect is described using ceramic H+ conductors, such as CaZr0.9In0.1O3-a, and mixed ionic-electronic conductors such as TiO2 and CeO2. The main phenomenol. features of **electrochem. promotion** are surveyed and the origin of the effect is discussed in view of recent surface spectroscopic and quantum mech. studies.

ACCESSION NUMBER: 1998:274489 CAPLUS
DOCUMENT NUMBER: 129:59823
TITLE: Non-faradaic electrochemical modification of catalytic activity using ionic and mixed conducting ceramics
AUTHOR(S): Vayenas, C. G.; Bebelis, S.; Pliangos, C.; Petrolekas, P. D.; Makri, M.
CORPORATE SOURCE: Department of Chemical Engineering, University of Patras, Patras, GR-26500, Greece
SOURCE: Proceedings - Electrochemical Society (1998), 97-24(Ionic and Mixed Conducting Ceramics), 509-529
CODEN: PESODO; ISSN: 0161-6374
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 51 THERE ARE 51 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2003 ACS
AB The authors report the 1st demonstration of non-Faradaic electrochem. modification of catalytic activity (NEMCA) for nonredox catalytic reactions, specifically the isomerization of alkenes on high surface area Pd/C or unsupported Pd-Ru cathodes interfaced to Nafion with a Pt-black/H2 counter **electrode**. A Nafion electrolyte **fuel cell** assembly was used to study current-voltage and conversion-voltage relations in the isomerization of 1-butene to cis- and trans-2-butene. Alkene isomerization was not obsd. on Pd/C in the absence of Nafion. The unprecedented **electrochem. promotion** of the heterogeneous catalysis of alkene isomerization is demonstrated.

ACCESSION NUMBER: 1997:724013 CAPLUS
DOCUMENT NUMBER: 128:54639
TITLE: Proton spillover promoted isomerization of n-butylenes on Pd-black cathodes/Nafion 117
AUTHOR(S): Ploense, Lloyd; Salazar, Maria; Gurau, Bogdan; Smotkin, E. S.
CORPORATE SOURCE: Department of Chemical and Environmental Engineering, Illinois Institute of Technology, Chicago, IL, 60616, USA
SOURCE: Journal of the American Chemical Society (1997), 119(47), 11550-11551
CODEN: JACSAT; ISSN: 0002-7863
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

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     (FILE 'HOME' ENTERED AT 17:07:59 ON 17 JAN 2003)

     FILE 'CAPLUS' ENTERED AT 17:08:05 ON 17 JAN 2003
L1           150 S ELECTROCHEMICAL PROMOTION
L2          8563 S 1 AND (FUEL CELL)
L3            13 S L1 AND (FUEL CELL)
L4             1 S L3 AND (WORKING ELECTRODE)
L5             9 S L3 AND ELECTRODE
L6             7 S L5 AND CATALYST
L7             4 S L6 AND PLATINUM

=> s l3 and co
        706271 CO
         23427 COS
        726646 CO
                  (CO OR COS)
L8            5 L3 AND CO

=> s l8 and catalyst
        610821 CATALYST
        596715 CATALYSTS
        779652 CATALYST
                  (CATALYST OR CATALYSTS)
L9            4 L8 AND CATALYST

=> d abs ibib l9 1-4

L9   ANSWER 1 OF 4  CAPLUS  COPYRIGHT 2003 ACS
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ACCESSION NUMBER:         2002:850186  CAPLUS
DOCUMENT NUMBER:          137:340035
TITLE:                    Fuel cell power plant with
                          electrochemical enhanced carbon monoxide removal
INVENTOR(S):              Ding, Yi; Burba, Joseph Carl
PATENT ASSIGNEE(S):       USA
SOURCE:                   U.S. Pat. Appl. Publ., 7 pp.
                          CODEN: USXXCO
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:
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PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002164507	A1	20021107	US 2001-848397	20010503

PRIORITY APPLN. INFO.: US 2001-848397 20010503

L9 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2003 ACS

AB The hydrogen-rich reformate used as a feed to polymer electrolyte **fuel cells** must contain less than 10 ppm **CO** since it poisons the Pt anode. The concn. of **CO** leaving the water-gas shift reactor is typically around 1 mol%, which is set by thermodn. equil. One method to remove the **CO** is by preferential oxidn. by using O2 over a (typically) Pt **catalyst** while minimizing the amt. of H2 oxidized. The activity and selectivity of this reaction were improved by a new pretreatment method for a 5 wt% Pt/.gamma.-Al2O3 **catalyst**. The pretreatment involved satg. the reduced **catalyst** with water and allowing it to vaporize during redn. The improvement is attributed to a redn. in size of the metallic Pt particles as measured by XRD and TEM.

ACCESSION NUMBER: 2002:651497 CAPLUS
DOCUMENT NUMBER: 138:41895
TITLE: Promotion of Pt/.gamma.-Al2O3 by new pretreatment for low-temperature preferential oxidation of **CO** in H2 for PEM **fuel cells**
AUTHOR(S): Son, I. H.; Shamsuzzoha, M.; Lane, A. M.
CORPORATE SOURCE: Department of Chemical Engineering, University of Alabama, Tuscaloosa, AL, 35487, USA
SOURCE: Journal of Catalysis (2002), 210(2), 460-465
CODEN: JCTLA5; ISSN: 0021-9517
PUBLISHER: Elsevier Science
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2003 ACS

AB The Pd-catalyzed NO-**CO** reaction at 320-480.degree. exhibited **electrochem. promotion**. This reaction was performed in a **fuel-cell** configuration where Pd is coated on Y2O3-stabilized ZrO2. The **electrochem. promotion** of the catalytic activity and modification of the selectivity to N2O is reversible and this system showed both electrophilicity and electrophobicity, depending on the direction of oxygen ion pumping. In a typical expt., the enhancement of reaction rate is 100 times greater than the rate of oxygen ion removal from the **catalyst** electrode. Rate enhancement, which is defined as the ratio of the reaction rate under electrochem. oxygen removal to the rate under open circuit, of .rho.CO2 = 2.2, .rho.N2O = 2.2 and .rho.N2 = 4.2 were measured for VWR = -1.8 V at 370.degree..

ACCESSION NUMBER: 2001:57507 CAPLUS
DOCUMENT NUMBER: 134:138342
TITLE: Solid electrolyte aided studies of NO-**CO** reaction on Pd
AUTHOR(S): Kim, Soonho; Haller, Gary L.
CORPORATE SOURCE: Electrochemistry Laboratory, Samsung Advanced Institute of Technology, Suwon, 440-600, S. Korea
SOURCE: Solid State Ionics (2000), 136-137, 693-697

CODEN: SSIOD3; ISSN: 0167-2738
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE
FORMAT

L9 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2003 ACS
AB The kinetics of the steam reforming reaction of CH4 were investigated at temps. 750 to 950.degree. under both open-circuit and closed-circuit conditions on Ni-YSZ solid oxide **fuel cell** (SOFC) anodes and polycryst. Ni film SOFC anodes of measured Ni surface area. It was found that the rate of methane reforming on the Ni surface exhibits a Langmuir-Hinshelwood type dependence on PCH4 and PH2O which results from competitive adsorption of carbonaceous species and oxygen or OH. Consequently the rate is maximized for intermediate PCH4 to PH2O ratios. The reaction kinetics are affected significantly by cell current and potential under closed-circuit conditions. Over a rather wide range of operating conditions the obsd. rate changes are Faradaic, which implies negligible variation in the catalytic properties of the Ni surface with potential. At lower temps., however, and particularly under conditions of carbon deposition, the rates of **CO**, H2, CO2 and, more importantly, carbon formation exhibit pronounced non-Faradaic, or **electrochem. promotion**, behavior. Some non-Faradaic behavior is also obsd. for higher H2O to CH4 ratios but in this case the effect of applied potential is reproducible but not readily reversible.
ACCESSION NUMBER: 1998:174766 CAPLUS
DOCUMENT NUMBER: 128:206778
TITLE: Catalysis, electrocatalysis and **electrochemical promotion** of the steam reforming of methane over Ni film and Ni-YSZ cermet anodes
AUTHOR(S): Yentekakis, I. V.; Jiang, Y.; Neophytides, S.; Bebelis, S.; Vayenas, C. G.
CORPORATE SOURCE: Department of Chemical Engineering, University of Patras, Patras, GR-26500, Greece
SOURCE: Ionics (1995), 1(5 & 6), 491-498
CODEN: IONIFA; ISSN: 0947-7047
PUBLISHER: Institute for Ionics
DOCUMENT TYPE: Journal
LANGUAGE: English

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L6 7 S L5 AND CATALYST
L7 4 S L6 AND PLATINUM
L8 5 S L3 AND CO

L9 4 S L8 AND CATALYST

=>